

Carboxyhaemoglobin levels and clinical features in five patients with acute carbon monoxide poisoning.

Case No	Age	Sex	Initial COHb (%)	Clinical features
1	47	M	23%	nausea, vomiting, headache, diarrhoea
2	40	F	30%	nausea, vomiting, headache, diarrhoea
3	14	F	24%	nausea, vomiting, headache
4	12	F	40%	nausea, vomiting, headache
5	10	M	16%	nausea, vomiting, headache

hyperbaric oxygen even when it is given late.<sup>9</sup> Chronic low level exposure is believed to be prevalent in the community and the diagnosis is usually missed because of the protean manifestations.<sup>10</sup>

It is worth noting that the presence of carboxyhaemoglobin makes monitoring by pulse oximetry unreliable because the displayed saturation level equals the sum of oxyhaemoglobin and carboxyhaemoglobin.<sup>11</sup> Significant hypoxia may therefore be masked and the clinician lulled into a false sense of security.

Initial treatment should be with a non-rebreathing circuit with a non-return valve, oxygen reservoir, and tight fitting mask. The type of mask used by ourselves only delivers a maximum inspired oxygen concentration of 85% if applied correctly and connected to high flow oxygen. It is important to supply the highest oxygen concentration possible as the elimination half life of carbon monoxide is 240 minutes when breathing air, but only 60 minutes when breathing 100% oxygen.<sup>7</sup>

The initial reluctance to transfer the other three patients suggests that the indications and potential benefits of hyperbaric oxygen are not well enough known; the reluctance appeared to be based on the belief that there is little scientific evidence to support the use of hyperbaric oxygen in carbon monoxide poisoning, as indicated by a recent survey by the BMA's Board of Science and Education.<sup>5</sup> The indications for the use of hyperbaric oxygen following carbon monoxide poisoning are:

- Loss of consciousness at any time
- Neurological or psychiatric symptoms or signs, other than a mild headache, identified on thorough testing
- Cardiac complications such as arrhythmias, ischaemic chest pain, or ischaemic ECG changes
- Carboxyhaemoglobin concentration more than 40%, regardless of symptoms
- Pregnancy

Although all of these indications are well described in published reports, we feel that they require stressing as they may often be overlooked. In addition, we recommend that carbon monoxide poisoning be routinely excluded in all cases of suspected food poisoning or sudden illness affecting several people, especially family members, who are brought from the same location.

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Cortical bone cyst following a greenstick radial fracture

A R Wass, J P Sloan

Abstract

There are only a few reports of well defined cystic lesions of the peripheral skeleton following fracture. In children, these lesions are mostly small cortical defects affecting the distal radial metaphysis after a greenstick or torus fracture. A cyst is reported complicating a greenstick fracture, together with a brief review of published reports confirming that these are asymptomatic lesions which can be managed conservatively without further investigation.

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Key terms: cortical bone cyst; greenstick fracture.

Case report

A 9 year old girl presented with a painful left wrist after a fall. Ten months previously she had fractured the distal end of the left radius (fig 1) and had made a full functional recovery. Clinical examination suggested further bony injury but radiographs revealed a cystic lesion in the distal radius, adjacent to the healed fracture (fig 2). A bone scan was "cold" at the site of the cyst. The symptoms settled quickly and the patient remained asymptomatic at follow up.

Accident and  
Emergency  
Department,  
Leeds General  
Infirmary,  
Great George Street,  
Leeds LS1 3EX  
A R Wass  
J P Sloan

Correspondence to:  
A R Wass,  
Senior Registrar in Accident  
and Emergency Medicine.



Fig 1 X rays of the left wrist demonstrating the initial greenstick fracture.



Fig 2 X rays after reinjury showing a well defined cystic lesion adjacent to the healed greenstick fracture.

### Discussion

Greenstick or torus fractures are common injuries in children. They usually heal after a brief period of immobilisation with complete functional recovery. The development of cysts adjacent to such fractures has occasionally been reported. A review of the English language reports<sup>1</sup> identified 17 similar cases, 15 involving the distal radial metaphysis. The incidence of these postfracture cysts is unknown. They are probably more common than the published reports would suggest since most distal radius fractures in children are monitored on clinical signs alone.

In all previously reported cases the postfracture cortical cysts were asymptomatic. These cysts are discovered either during radiological follow up of a fracture or after reinjury of the same limb (as in this case). They usually appear more than one month after the fracture. Characteristically the cysts are less than 10 mm in diameter, do not expand, appear rounded or

slightly oval shaped, and may be multiple.<sup>2</sup> Healing of the initial fracture is not affected by these cysts, nor do they predispose to pathological fractures. Pfister-Goedeke and Braune reported spontaneous resolution in three out of nine cases (33%) at 3 years.<sup>3</sup>

There is debate about the aetiology of these cysts. Pfister-Goedeke and Braune<sup>3</sup> suggested that they are resorption cysts within an excessive periosteal reaction, related to the subperiosteal haematoma that accompanies greenstick fractures. Phillips and Keats attribute post-traumatic cysts to the resorption of intraosseous haemorrhage.<sup>4</sup> Malghem *et al* reported that computed tomographic scanning of two cases showed a density consistent with a fatty content.<sup>5</sup> They postulated that this fat resulted from the inclusion of medullary fat within the subperiosteal haematoma. This theory of transcortical escape of intramedullary fat is supported by Davids *et al*, who showed fat within a postfracture cortical cyst on magnetic resonance imaging.<sup>1</sup> Uncertainty about the aetiology of these lesions is likely to continue as long as their histological nature remains unknown.<sup>6</sup> However, to date, biopsy of these lesions has never been clinically justified in view of their asymptomatic nature.

These small asymptomatic postfracture cortical cysts are invariably incidental x ray findings and of little clinical importance. Failure to recognise this apparently rare complication of minor fractures in children may cause confusion for the clinician and unnecessary concern for parents. Expensive diagnostic investigation or operative intervention are not indicated in these cysts. We advocate review after 6 to 12 months to ensure that the lesion remains asymptomatic.

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## Two cases of paraduodenal hernia, a rare internal hernia

Thomas McDonagh, George A Jelinek

### Abstract

**Paraduodenal hernia is a rare congenital internal hernia which arises from an error of rotation of the midgut with entrapment of the small intestine beneath the develop-**

**ing colon. It is important as it usually presents as intestinal obstruction, and before laparotomy is often misdiagnosed. Mortality increases significantly with delays in surgical treatment. Two cases**

Department of  
Emergency Medicine,  
Fremantle Hospital,  
PO Box 480,  
Western Australia 6160,  
Australia  
T McDonagh  
G A Jelinek

Correspondence to:  
G A Jelinek MD.